

REMARKS

Prior to entry of this amendment, claims 1-16 are currently pending in the subject application. By the instant amendment, claims 1, 3, 7-10 and 12-14 have been modified to correct informalities and several grammatical errors, and new claims 17-19 have been added. Claim 1 is the only independent claim.

Applicants note with appreciation the Examiner's acknowledgement of applicants' claim for foreign priority and receipt of a certified copy of the priority document.

Applicants also note with appreciation the Examiner's acknowledgement and acceptance of the drawings filed on January 15, 2004.

Applicants further note with appreciation the Examiner's consideration of applicants' Information Disclosure Statements filed April 23, 2004, and July 13, 2004.

A. Introduction

In the outstanding Office action, the Examiner objected to the specification as failing to provide proper antecedent basis for the claimed subject matter, specifically "passivation layer" in line 20 of page 14 (paragraph [0051]); rejected claims 1, 3 and 12-15 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention; rejected claims 1-2, 6 and 10-15 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,062,681 to Field et al. ("the Field et al. reference"); rejected claims 3-5 and 7-8 under 35 U.S.C. § 103(a) as being unpatentable over the Field et al. reference in view of U.S. Patent No. 5,751,317 to Peeters et al. ("the Peeters et al. reference"); and rejected claim 16 under 35 U.S.C. § 103(a) as being unpatentable over the Field et al. reference.

B. Objection to the Specification

In the outstanding Office action, the Examiner objected to the specification as failing to provide a proper antecedent basis for the claimed subject matter and stated that the

reference to a "passivation layer" in line 20 of page 14 is "ineffective because the term is unclear and one of ordinary skill in the art could not ascertain the meaning of the term."

Office action of January 30, 2007, at page 2, ¶ 2. Applicants respectfully traverse the objection and submit that the term "passivation layer" is a well known and commonly employed terminology in the art and the objection thereof in the present application is improper.

It is well-settled law that absent an explicit definition, terminology employed in claim language and in the specification is given its plain meaning while the "plain meaning" refers to the "ordinary and customary meaning given to a term by those of ordinary skill in the art." MPEP, §§ 608.01(o), 2111.01. In this respect, applicants direct the Examiner's attention to the American Heritage Dictionary definition of the verb "passivate,"

- (1) to treat or coat (a metal) in order to reduce the chemical reactivity of its surface.
- (2) to coat (a semiconductor, for example) with an oxide layer to protect against contamination and increase electrical stability.

Further, applicants point out that a "passivation layer" is a well known element in the art employed in connection with electrical components or metallic layers of semiconductors, printers, control valves, and so forth. In the present application, for example, the first passivation layer is coated onto the heating element and the insulation layer to impart, *inter alia*, insulation properties thereto. Applicants respectfully submit that there is nothing relating to this term "passivation layer," whether standing alone or as used in the specification of the instant application, that can be characterized as being unclear or that cannot be ascertained by one of ordinary skill in the art. As such, the objection to the term "passivation layer" by the Examiner is not understood. Accordingly, applicants respectfully requests that the objection to the term "passivation layer" in the specification be favorably reconsidered and withdrawn.

C. Asserted Indefiniteness Rejections of Claims 1, 3 and 12-15

In the outstanding Office action, the Examiner rejected claims 1, 3 and 12-15 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Applicants respectfully submit that the language employed in claims 1 and 12-15 is definite and consistent with the normal use of similar type of language describing structural elements and/or their relative position. Nonetheless, in order to advance prosecution of the subject application, applicants have amended claims 1 and 12-14 to clarify language indicated by the Examiner as indefinite. More specifically, allegedly unclear language has been eliminated from claims 1 and 14, and structural limitations have been added to claims 12-13, as supported, for example, in ¶¶ 40-42 of the specification as originally filed. Additionally, an upper limit has been added to claim 3 to overcome its indefiniteness rejection, as supported by ¶ 46. Accordingly, it is believed that the rejection under 35 U.S.C. § 112, second paragraph, has been traversed by the preceding amendments, and applicants respectfully request favorable reconsideration and withdrawal of the rejection of claims 1, 3 and 12-15 under 35 U.S.C. § 112, second paragraph.

D. Asserted Anticipation Rejection of Claims 1-2, 6 and 10-15

In the outstanding Office action, the Examiner rejected claims 1-2, 6 and 10-15 under 35 U.S.C. § 102(b) as being anticipated by the Field et al. reference. Applicants respectfully traverse this rejection, and respectfully submit that the Examiner has failed to set forth a *prima facie* case of anticipation for at least the reasons set forth below.

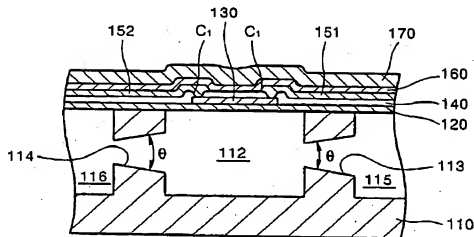
Independent claim 1, recites,

A micro-pump, comprising:
a pumping chamber to be filled with a fluid;
at least one fluid entrance and at least one fluid exit in communication with the pumping chamber;
a heating element at one side of the pumping chamber to generate bubbles in the pumping chamber by heating the fluid; and

electrodes for applying current to the heating element, wherein a fluid flow into or out of the pumping chamber is by expansion and contraction of the bubbles, and wherein *a cross-sectional area of at least one of the fluid entrance and the fluid exit varies along a direction of the fluid flow.*

In this respect, the Examiner's attention is directed to FIG. 4B of the present application reproduced below.

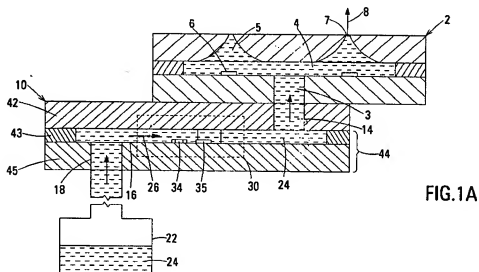
FIG. 4B



As illustrated in FIG. 4B above, the cross sections of the fluid entrance 113 and of the fluid exit 114 in the present application are irregularly shaped. More specifically, the portions of the pump that constitute the inlet to and outlet from the pumping chamber are shaped to have *angled surfaces with respect to a bottom surface of the pumping chamber.* In other words, the inlet and outlet portions of the pumping chamber are specifically designed to provide passages with a *varied cross-sectional area between the manifold and the pumping chamber* in order to affect the velocity of the fluid flow.

The Field et al. reference, on the other hand, neither teaches nor even remotely suggests an inlet or an outlet portion of a pumping chamber that has a cross sectional area

that varies *along its length*. In this respect, applicants direct the Examiner's attention to FIG. 1A of the Field et al. reference, cited on page 4 of the Office action of January 30, 2007, as allegedly anticipating claim 1 and as reproduced below.



As may be seen in FIG. 1A of the Field et al. reference, the cross sections of the ink inlet 18 and ink outlet 14 are not varied. In fact, the Field et al. reference teaches inlet/outlet portions having *rectangular cross-sectional areas*. With respect to the Examiner's assertion that the cross sectional area in the Field et al. reference varies between the ink reservoir 22 to the ink inlet 18 and between the ink outlet 14 and the manifold 4, *Office action of January 30, 2007, at page 4*, applicants respectfully reiterate that the disclosure of the Field et al. reference does not teach, or even remotely disclose, variation of a cross sectional area *within a single element*, i.e., fluid entrance or fluid exit, as opposed to different cross sectional areas of two potentially adjacent elements. Accordingly, the Field et al. reference clearly does not anticipate or even remotely suggests the subject matter of claim 1.

In view of the above, applicants respectfully submit that the Field et al. reference fails to teach or suggest each and every element of claim 1, and therefore, claim 1 is believed

allowable over the cited prior art. Accordingly, applicants respectfully request that the rejection of claim 1 and claims dependent thereon be favorably reconsidered and withdrawn.

E. Asserted Obviousness Rejection of Claims 3-5, 7-8 and 16

In the outstanding Office action, the Examiner rejected claims 3-5 and 7-8 under 35 U.S.C. § 103(a) as being unpatentable over the Field et al. reference in view of the Peeters et al. reference, and rejected claim 16 under 35 U.S.C. § 103(a) as being unpatentable over the Field et al. reference alone. However, applicants respectfully submit that the Peeters et al. reference does not supply the teachings noted above as missing from the Field et al. reference. In order to establish a *prima facie* case of obviousness of an invention, a "prior art reference (or references when combined) must teach or suggest all the claim limitations." *MPEP*, 706.02(j). Accordingly, applicants traverse this rejection and respectively submit that claims 3-5, 7-8 and 16 are allowable for at least the reasons set forth above regarding claim 1.

F. New Claims 17-19

Claims 17-19 are added by the instant amendment. No new matter is added, and support for these claims may be found, for example, in FIG. 4B and the corresponding text and original claim 13 of the application as originally filed. Applicants respectfully request entry and examination of new claims 17-19.

G. Conclusion

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

LEE & MORSE, P.C.

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Eugene M. Lee, Reg. No. 32,039

LEE & MORSE, P.C.
3141 FAIRVIEW PARK DRIVE, SUITE 500
FALLS CHURCH, VA 22042
703.207.0008 TEL
703.207.0003 FAX

PETITION and
DEPOSIT ACCOUNT CHARGE AUTHORIZATION

This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, applicant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying-papers may also be charged to Deposit Account No. 50-1645.